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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/725,428	11/29/2000	Gunter Krodel	A33676 PCI USA A	9507
21003	7590	07/12/2004	EXAMINER	
BAKER & BOTTS 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			NGUYEN, NGOC YEN M	
			ART UNIT	PAPER NUMBER

1754

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

Application Number: 09/725,428  
Filing Date: November 29, 2000  
Appellant(s): KRODEL ET AL.

**MAILED**  
JUL 12 2004  
**GROUP 1700**

\_\_\_\_\_  
J. J. Maune  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed April 12, 2004.

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The appellant's statement of the issues in the brief is correct.

**(7) Grouping of Claims**

Appellant's brief includes a statement that all claims stand or fall together.

**(8) Claims Appealed**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) Prior Art of Record**

4,229,411	Kisters et al	10-1980
6,030,591	Tom et al	02-2000
6,069,291	Rossin et al	05-2000

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al (6,069,291) in view of Kisters et al (4,229,411) and Tom et al (6,030,591).

Rossin '291 discloses a process for the decomposition of perfluoroalkanes to HF and CO<sub>2</sub> by contacting, in the presence of oxygen, the perfluoroalkanes with a catalyst (note claim 1). Rossin '291 teaches that perfluoroalkanes are released to the environment during certain industrial processes, such as electrolytic aluminum smelting for example, as by-products during the manufacture of tetrafluoroethylene, and during semiconductor manufacturing processes (note column 1, lines 21-25). Rossin '291

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further discloses that after the gas stream containing perfluoroalkanes has been treated, further treatment may be necessary to remove hydrofluoric acid from the effluent stream. If the concentration of hydrofluoric acid in the effluent stream is deemed unacceptable, conventional collection or abatement processes, such as caustic scrubbing, may be employed to avoid venting acid gases directly into the atmosphere (note column 5, lines 38-47).

Rossin '291 discloses that the process involves passing a gas stream containing one or more perfluoroalkanes, an oxidizing agent, such as air and water vapor through a catalyst bed containing a catalyst composition and heated to the desired operating temperature. The flow rates through the system should be sufficient to allow for greater than at least 80% and preferable greater than 90% destruction of the perfluoroalkane(s) present in the stream (this fairly suggests that the flow rate of the oxygen is controlled). The process described herein may be operated at temperatures between about 400°C to about 1000°C (note column 5, lines 13-27) (this fairly suggests that the amount of heat supplied to the reaction is controlled).

Rossin '291 further discloses that the gaseous or liquid phase perfluoroalkanes or mixtures of perfluoroalkanes can be injected into a gas stream, including an oxidizing agent, such as air for example, and water. The gas stream temperature and flow rate, and rate of perfluoroalkane(s) injection, may be controlled to achieve the desired concentration of perfluoroalkane(s) to be treated. The resulting gas stream containing the perfluoroalkane(s) is then contacted with the catalyst composition (note column 5, lines 28-37).

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These disclosures fairly suggest that the process conditions of Rossin '291 are controlled to achieve the desired effect, i.e., greater than 90% destruction of the perfluoroalkanes.

The "perfluoroalkanes" (plural form) and "mixtures of perfluoroalkanes" as stated above are considered as the claimed "waste gases".

The differences are Rossin '291 does not disclose (1) the step of controlling the scrubbing condition by monitoring the amount of harmful substances in the effluent gas before and after the scrubbing step and (2) the decomposing step is carried in a combustion chamber having a combustible gas.

For (1) Kisters '411 discloses a process and apparatus for the removal by absorption of noxious compounds from waste gases (note column 1, lines 10-11). Kisters '411 discloses a continuous and automatic measurement of the concentration of the components in the gas and causing the amount of neutralizing agent to become adjusted automatically and continuously dependent on these measurements of the gas concentration so as to always have present the stoichiometric amount of neutralizing agent in the gas (note last paragraph of column 1). Preferably, the concentration of pollutants is measured at several places, preferably prior and directly behind the absorber and after discharge from a filter arranged behind the absorber (note column 2, lines 1-4). All these measuring devices may be connected to a central control arrangement.

Since in both Rossin '291 and Kisters '411, caustic solution is used to remove the acidic pollutant in the effluent gases, thus, when the amount of caustic solution is controlled, the pH would also be controlled.

Kisters '411 does not specifically disclose the type of the measuring devices, however, it would have been obvious to one of ordinary skill in the art to use any known and commercially available means to effectively measuring the amount of the pollutants in the waste gases, therefore, without a showing of criticality or unexpected results, the use of optical spectroscopy or any other known device is not seen as a patentable difference.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the control method as suggested by Kisters '411 for the scrubbing step of Rossin '291 because such control method would automatically control the amount of neutralizing agent (e.g., caustic solution) for the scrubbing step.

For (2), in Rossin '291 the process is to decompose perfluoroalkanes, in the presence of oxygen to produce HF and CO<sub>2</sub> at high temperature (note claim 1). However, Rossin '291 does not specifically disclose how the heat is supplied. There are only two ways to supply heat the process of Rossin '291, either by direct heating or indirect heating. The use of either one would have been well within the skill of the artisan.

Tom '591 is applied to show that it is conventional in the art to use direct heating, i.e., by incinerating, as an effective means of destroying halocarbons, including PFCs.

The reaction of the incineration method as disclosed in Tom '591 produces CO<sub>2</sub> and HF just like in the process of Rossin '291.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incineration method to carried out the process of Rossin '291 to raise the process temperature by direct heating because such process is known and conventional in the art as shown by Tom '591.

**(11) Response to Argument**

Appellants argue that Kisters discloses a process and apparatus for the removal by absorption of noxious compounds from waste gases while the claimed invention is directed to a combustion of multiple process gases of varying content and also post treatment of the combustion by-products.

Both Rossin and Kisters are related to a process for removing pollutants from waste gases. In Rossin, it is desirable to maximize the removal of the pollutants, i.e. "preferably greater than 90% destruction of perfluoroalkane(s)" (note column 5, lines 20-21). Thus, the purified gases in Rossin must be tested, at least periodically, to determine the percentage destruction of perfluoroalkane, and the process conditions must be adjusted accordingly to achieve the desired results. In other words, Rossin does suggest the desire of controlling the process conditions based on the resulting percentage destruction of perfluoroalkane. Kisters teaches that in the art of removing pollutants from waste gases, in view of the continuous changes in operating conditions,



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continuous adjustments are necessary to comply with the specific conditions. These adjustments are costly and are normally effective only with a certain phase lag. An economically optimum and at all times satisfactory removal of the pollutions is not assured thereby (note column 1, lines 38-44). Kisters solves this problem by a continuous and automatic measurement of the concentration of the components in the gas, before and after the removal step, and process conditions are adjusted according to these measurements, i.e. Kisters teaches the desire of having an on-line, real-time, feed-back control for a process of removing pollutants from exhaust gases in order to achieve uniform quality of the purified gas. Such teaching can be equally applied to any other process of removing pollutants from other exhaust gases. The process of removing pollutants from exhaust gases can generically considered as a black box, and in order to control the process within the black box in real time, Kisters fairly suggests that the concentration of the components in the gases coming into and coming out the black box are continuously and automatically measured and using these measurements to adjust the conditions of the removal step within the black box. When Rossin is taken in view of Kisters, the black box of Rossin would have 2 process steps, i.e. the combustion step and the scrubbing step. It would have been obvious to one of ordinary skill in the art to continuously and automatically measure the concentration of the components in the waste gases going to the removal process and the purified gases coming out from the removal process of Rossin, as suggested by Kisters, to control the process conditions of both steps in Rossin, in order to better control the process and to achieve the desired result without a phase lag and thus to obtain a uniform quality of the

purified gas (note column 1 of Kisters '411, lines 45-51). As stated above, the relationship between the process conditions, such as oxygen flow rate, reaction temperature (which in turn, the amount of combustible gas), the amount of scrubbing solution (which in turn, the pH) and the percentage destruction of the perfluoroalkanes is known and disclosed in Rossin (note column 5, lines 13-48).

Appellants argue that Kisters measures the concentration to simply determine absorptive uptake and adjust a single concentration to provide a stoichiometric reaction with a single waste gas.

It should be noted that Kisters measures concentration of the "components", not just a single concentration. Again, as stated above, the disclosure of Kisters '411 of measuring the concentration of the components in the gases at the inlet and again at the outlet is considered for a generic, overall process of removing pollutants from the gases, not just for a process of removal noxious compounds by absorption.

Appellants argue that the waste gas of Kisters come from only one process to allow a stoichiometric amount of neutralizing agent to be determined, while the claimed invention contemplates successively or simultaneously purifying waste gases from a variety of processes.

Appellants' claims require "waste gases" which can be waste gases from a single process but contain multiple components, i.e. a combination of  $\text{CF}_4$  waste gas and  $\text{C}_2\text{F}_6$  waste gas, both come from a semiconductor manufacturing process, is considered the same as the claimed "waste gases". Appellants' claims do not specifically require that the waste gases come from a variety of processes.

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same as the claimed "waste gases". Appellants' claims do not specifically require that the waste gases come from a variety of processes.

Appellants argue that the disclosure of Tom et al teaches away from the claimed invention by describing the potential drawbacks of incineration.

Tom is only applied to teach that direct heating is conventional in the art of decomposing perfluorocarbon. It should be noted that the process of Rossin is to decompose perfluorocarbon at high temperature.

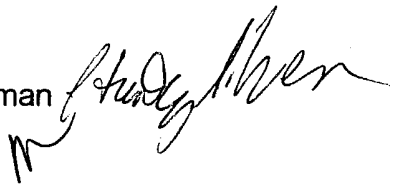
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

  
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June 28, 2004

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